

## REMARKS

Examiner J. L. Brophy is thanked for the thorough examination and search of the subject Patent Application. Claims 1, 12, and 24 have been amended and Claim 5 has been canceled.

All Claims are believed to be in condition for Allowance, and that is so requested. It is requested that should the Examiner not find that the claims are Allowable, that she enter the Amendment for purposes of Appeal.

It is agreed with the Examiner that with the amendment to Claim 24 entered in the previous response, that Claim 24 and Claim 5 are substantial duplicates. Therefore, Claim 5 has been canceled. It is not agreed that Claims 28 and 16 are substantial duplicates since Claim 16 claims a "roughened silicon-implanted surface" but Claim 28 does not.

Reconsideration of the rejection under 35 U.S.C. 102 of Claims 1, 3 and 6 as being anticipated by JP08102489A is requested in view of amended Claim 1 and in accordance with the following remarks.

Applicants' invention provides a means for improving adhesion of a TEOS oxide layer to an underlying low dielectric constant material layer. Silicon ions are implanted into the underlying layer to improve adhesion. As shown in Fig. 2, the silicon implantation is performed on a flat surface. The underlying passivation layer 12, now claimed in amended Claim 1, is also a planarizing layer. The Examiner is thanked for pointing out that the passivation layer claim

was missing in Claim 1. In JP08102489A, the silicon implantation is performed over non-planar features (See Fig. 1a).

JP08102489A teaches implanting silicon ions into a plasma TEOS film to prevent moisture diffusion. Those skilled in the art of microelectronics know that the definition of low dielectric constant means a dielectric constant of less than 3, as shown in exhibits presented with the previous responses. The plasma TEOS film of JP08102489A must be a film deposited by CVD. Thus, plasma TEOS is one of the materials in Exhibit F "silicon dioxide films applied by chemical vapor deposition" and having a dielectric constant of 4.1 to 4.2. Since this is not a low dielectric constant material, it is not one of Applicants' preferred materials. Line 2 of Claim 1 specifies depositing a "low dielectric constant material layer". It is believed that the amendment to Claim 1 overcomes the 102 rejection over JP08102489A. A low dielectric constant material layer is not taught by the reference.

Reconsideration of the rejection under 35 U.S.C. 102 of Claims 1, 3 and 6 as being anticipated by JP08102489A is requested in view of amended Claim 1 and in accordance with the remarks above.

Reconsideration of the rejection under 35 U.S.C. 102 of Claims 1, 3, and 6 as being anticipated by Watanabe et al is requested in view of amended Claim 1 and in accordance with the following remarks.

Watanabe et al teaches implanting silicon ions into a spin-on-glass film to decompose its organic components. As discussed in response to a previous office action, organic spin-on-glass appears to fall into the category of low dielectric constant materials of carbon-doped silicon oxide. The lengthy discussion, not repeated here, shows that Watanabe's siloxane SOG has a high dielectric constant of greater than 3. Therefore, the low-k materials recited in Applicants' claim are not taught by Watanabe et al.

Reconsideration of the rejection under 35 U.S.C. 102 of Claims 1, 3, and 6 as being anticipated by Watanabe et al is requested in view of amended Claim 1 and in accordance with the remarks above.

Reconsideration of the rejection under 35 U.S.C. 103 of Claims 4, 5, and 24-27 as being unpatentable over JP08102489A or Watanabe et al is requested in view of Amended Claims 1 and 24 and in accordance with the following remarks.

JP08102489A teaches implanting silicon ions into a plasma TEOS film to prevent moisture diffusion. Watanabe et al teaches implanting silicon ions into a spin-on-glass film to decompose its organic components. As discussed above, the low dielectric constant ( $<3$ ) materials claimed in Claims 1 and 24 are not taught or suggested in the references. Furthermore, the roughened surface of the low-k layer resulting from the silicon ion implantation and providing improved adhesion of the overlying layer (Claim 24) is not taught or suggested by the references. Furthermore, Claim 24 has been amended to claim only alkyl silsesquioxanes and

the porous and non-porous organic and inorganic polymers as the low dielectric constant material. These materials are not taught or suggested by the references.

Reconsideration of the rejection under 35 U.S.C. 103 of Claims 4, 5, and 24-27 as being unpatentable over JP08102489A or Watanabe et al is requested in view of Amended Claims 1 and 24 and in accordance with the remarks above.

Reconsideration of the rejection under 35 U.S.C. 103 of Claims 12, 14-17, 23, and 28-32 as being unpatentable over Watanabe et al is requested in view of Amended Claims 12 and 28 and in accordance with the following remarks.

Watanabe et al teaches implanting silicon ions into a spin-on-glass film to decompose its organic components. As discussed above, low dielectric constant ( $<3$ ) materials claimed in Applicants' invention are not taught or suggested in the reference. It is agreed that forming a copper layer within an opening is taught in Watanabe et al, but this is not a damascene process. Furthermore, Claims 12 and 28 have been amended to claim only alkyl silsesquioxanes and the porous and non-porous organic and inorganic polymers as the low dielectric constant material. These materials are not taught or suggested by the reference.

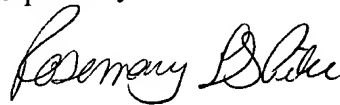
Reconsideration of the rejection under 35 U.S.C. 103 of Claims 12, 14-17, 23, and 28-32 as being unpatentable over Watanabe et al is requested in view of Amended Claims 12 and 28 and in accordance with the remarks above.

Applicants' invention claims "a low dielectric constant material layer". Although "less than 3.0" was not included in the Specification, it is believed that this is the common definition known in the art, as evidenced by exhibits presented previously, and understood by the inventors at the time the invention was made. While it is possible for some of the dielectric constant materials listed in the Specification to have dielectric constants of greater than 3, it is only those materials having low dielectric constants (i.e. less than 3) that are desired to be used in the process of the invention.

Allowance of all Claims is requested.

It is requested that should Examiner Brophy not find that the Claims are now Allowable that the Examiner call the undersigned at 765 4530866 to overcome any problems preventing allowance.

Respectfully submitted,

A handwritten signature in cursive script, appearing to read "Rosemary S. Pike".

Rosemary L. S. Pike. Reg # 39,332